# Hoffman | Controls
Product Data

## 870-10D Head Pressure Control
## ECM / PSC Fan Cycle Switch

## Description

The 870-10D fan cycle electronic head pressure control switches the condenser fan motor on and off to vary the air volume through the condenser consequently regulating head pressure for proper heat rejection in low ambient temperatures. The control is compatible with discrete speed Electrically Commutated Motors (ECM) as well as PSC or Shaded Pole induction motors and will maintain the pressure differential at the expansion valve for proper superheat. It helps preclude evaporator coil freezing and eliminates liquid and oil migration that damages or destroys compressors. The control monitors the head pressure by sensing excessive liquid sub cooling and changes the air volume through the condenser. All control parameters are embeded with no field adjustments required and is specifically applicable for TXV thermal expansion type devices using any refrigerant type. This model's sensor input allows for the control of a single refrigerant circuit.

The 870-10D Fan Cycle Switch's operation is dependent on the equipment's proper refrigerant charge and resulting liquid subcooling of the liquid refrigerant resulting in 4ºF to 6ºF subcooling at ARI conditions at 95ºF ambients. The control's sensor must be placed at the exit of the condenser, and the sensor should be insulated and weather protected. The control monitors the liquid line temperature (degrees of excessive sub-cooling) which is directly proportional to the head pressure. Power to the motor is applied at 78°F liquid line temperature (ambients above 60ºF) and allows the motor to operate at full speed. At 60°F liquid line temperature (ambients below 40ºF) the power is removed allowing the motor to cycle "off" to maintain adequate head pressure under low ambient conditions. This control function maintains a minimum pressure differential for proper expansion of the refrigerant that maintains proper system operating conditions, while assuring proper suction pressure ( evapoator temperature) over the anticipated ambient operating range.

The purpose of the 870-10D control is to assure adequate pressure in low ambients:

a) for maintaining adequate pressure differential between Hi & Low side pressures for the TXV expansion device.

b) assure an adequate suction pressure to preclude freezing of the DX coil for A/C applications.

c) eliminate oil foaming (oil migration) and/or liquid slugging.

It is extremely IMPORTANT when installing any HCC low ambient control that the installing technician evaluate the systems:

a) Liquid line temperature for the current ambient temperature.

b) Measure and determine the liquid subcooling for the ambient temperature.

c) Adjust units refrigerant charge to obtain liquid line & subcooling values on "Low" ambient vs. condensing tempera tures, subcooling, and liquid line temperatures ºF chart.


**870-10D ECM/PSC Fan Cycle Switch**
**Temperature Based Electronic Head Pressure Control**

## Features

- Supplies up to 10 amps for discrete speed ECM or PSC condenser fan motor(s) operation.
- A fixed span range allows for thermal expansion valve TXV applications for optimum low ambient performance.
- Multi voltage model.(115/208-230 VAC)
- 50/60 Hz operation.
- Applicable for all refrigerant types.
- Eliminates the need for system penetration.
- Monitors liquid line temperature (liquid subcooling).
- Single Sensor only applications.
- Full voltage "Torque Start" ensures proper fan rotation.
- Fan cycles “OFF" & "ON” based on liquid line temperature.
- Eliminates compressor “slugging” and oil migration.
- Simple field installation.
- Optional **Adjustable Sensor Simulator** — Part Number 510-0027-000 is available for manual evaluation of motor control.
- Optional **Weatherproof Kit** (NEMA 3R) — Part Number 545-0202-007.

# Application

The 870-10D Fan Cycle Switch is typically utilized on air-cooled condenser fan motors found in AC&R systems. They are used on the following direct drive motor types:

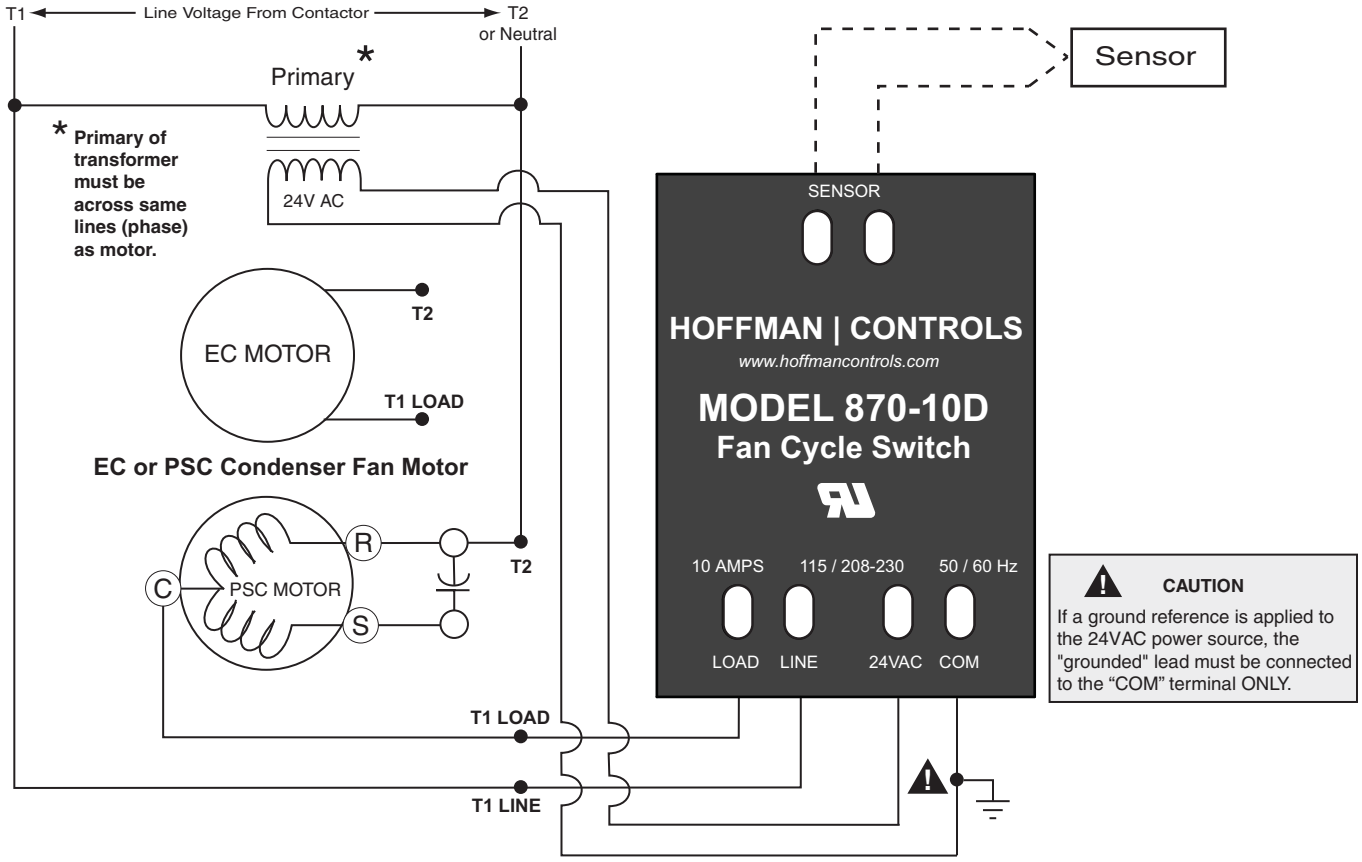
- Single Phase, single speed, open frame PSC or Shaded Pole.
- Single Phase, single speed EC motors.
- Sleve or ball bearing, direct drive only.
- Some PSC Totally Enclosed Motors (TEC) with 60°C ambient rating may be applicable, however the use of PSC TEC motors is generally not reccommended. (Verify before use).

## Typical Air Conditioning and Refrigeration Applications

- Commercial air conditioning
- Supermarkets
- Computer rooms
- Frozen food storage
- Humidity control
- Glycol coolers
- Hospitals
- Any other low ambient applications

# Specifications

| | |
|---|---|
| Voltage Range (10%) | 115/208–230VAC |
| Current (no de-rating required) | 10 Amps |
| Frequency | 50/60 Hz |
| Inputs | |
| Sensor (strap on) | 10K ohm @ 77°F |
| Power (same phase as motor) | 22-30 VAC |
| Outputs | |
| Fan Cycle Switch–Single Phase | 115V/208-230V AC |
| Can drive multiple motors up to 10A maximum | |
| Span 18°F (Fixed) | (60°F-78°F) |
| Environment | |
| Operating, non-condensing | –30°F to +160°F |
| Dimensions (L x W x H) | 5.56" x 3.32" x 1.25" |




**Wiring Diagram for the 870-10D**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Form: 172-0254-003 Rev C